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ABSTRACT

Teaching critical thinking is what employers ask of educators and what teachers expect from their students. This paper attempts to reestablish the importance of critical thinking and how Valencia Community College's (Florida) critical thinking competency can be developed using several teaching models. A discussion is provided on the background of critical thinking, specifically where critical thinking skills come from. These skills have to be learned and fine-tuned with the assistance and guidance of an external entity. Competency I of a Valencia Community College graduate states that each graduate should be able to "think critically and make reasoned choices by acquiring, analyzing, synthesizing, and evaluating knowledge." Nine Valencia sub-competencies that can be used in the process of assessing and measuring critical thinking, include: (1) know what to observe and systematically make accurate observations; (2) represent observations in an appropriate pattern to show relationships; (3) recognize problems that need to be and can be solved; (4) use sequential and holistic approaches to problem solving; and (5) analyze information and ideas to make decisions. Some models of teaching that fit easily into the critical thinking competency are concept attainment, scientific inquiry, inquiry training, simulation, role playing, thinking inductively, advanced organizer, and synetics. This paper concludes with some activities instructors can use to develop critical thinking in the classroom. (VWC)

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Teaching Critical Thinking at the Community College

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INTRODUCTION

Critical thinking is the cornerstone of a well rounded and complete college education. Students graduating with a strong critical thinking background tend to find jobs using their talents quickly and maintain high levels of success throughout their careers. Teaching critical thinking is what employers ask of educators. Critical thinking is want teachers expect from their students. The objective is develop effective methods and models that will make the student more productive not only in the classroom, but in the workplace. This paper shall attempt to reestablish the importance of critical thinking and how Valencia Community College's critical thinking competency can be developed using several teaching models.

CRITICAL THINKING BACKGROUND

Before those activities can be addressed, we must have a basic understanding on where critical thinking skills come from. Critical thinking skills are not innate skills that everyone is born having. These skills, like other skills, have to be learned and fine tuned with the assistance and guidance of an external entity. Often this entity is a person of great influence, such as a teacher. Most human beings have the ability to perform basic mental tasks with little or no coaching or preparation. To get past what I will refer to as the "motor-recall" level, a person must experience some amount of cognitive and affective growth. Thinking for oneself is also part of growing up.

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Progression on the way to becoming a critical thinker can only occur when that person is ready. Being ready is not a conscious decision. One does not wake up one morning and decide to begin to think critically and do it successfully from that point on.

Critical thinking allows individuals to build frameworks for sorting information and developing systems to keep aware of surroundings. One of life's goals is to create "a framework that's reliable and effective, something that is consistent with our experiences (Penner 1995)."

Most community college students are ready and able to think critically. The concern of the instructor is the willingness of the students. If the student is not willing to make the jump, there can only be two alternatives. The instructor must either leave the student alone and press on with the others, or push that student into this new land of critical thinking. I am a proponent of the latter. It is important to let the students know early on that they are expected to leave the community college a purposeful critical thinker and that each course is one stop on that journey. Faculty, must promote the learning of critical thinking skills like the military teaches survival skills. A student's academic life could be in jeopardy, if we take critical thinking lightly.

VALENCIA COMPENTENCY I

Competency I of a Valencia Community College graduate states that each graduate should be able to "Think critically and make reasoned choices by acquiring, analyzing, synthesizing, and evaluating knowledge." This, for many students and faculty, is very broad and immeasurable. To make this competency more feasible to accomplish, there is an associated list of nine sub-competencies that can be used in the process of assessing and measuring critical thinking. I will

address these nine sub- competencies as they relate to the Valencia student and integrate descriptions of activities that can be used for each, where possible. An important point to remember is that the students in one particular section might react differently than those in another section to material and methods used. Adjust the activities based on where one see his or her students now and where one wants them to go. Lastly, there is often an overlapping of activities across the sub-competencies and teaching models.

In a draft statement by Michael Scriven and Richard Paul for the National Council for Excellence in Critical Thinking, critical thinking was defined as the "intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action." The competencies of a Valencia graduate attempt to do these things.

The following is a list of the Valencia sub-competencies in the critical thinking area, with an attempt at explaining what each is and how it relates to Valencia students.

1. Know what to observe and systematically make accurate observations.

In order for a student to fulfill this, she can be given many different items to look at, watch, read, hold, and hear. These items should have a singular commonality that is to be observed and arranged with purpose for optimal results. The student is then charged with the task of finding key points and useful information from each item. The student must receive feedback from the

instructor and classmates on what the key observations were and how they were correctly derived, upon completion of the exercise.

2. Represent observations in an appropriate pattern to show relationships.

In order for a student to fulfill this, he must be able to not only make observations, but form relationships among the various bits of data or information observed. This leads to and involves the development of predictions. The relationships can and should be tested for reliability and validity.

3. Recognize problems that need to be and can be solved.

In order for a student to satisfy this, she must understand the physical and practical parameters and limitations of solutions to a particular situation. It is essential that every student know when an answer is reasonable and what the answer really means. This also refers to the acknowledgement of extraneous information that contains within itself the ingredient for an unrelated solvable problem.

4. Use sequential and holistic approaches to problem solving.

This is a two part competency designed to keep the student from putting on "mind blinders." It is important for the student to be able to see the "forest" and "trees" when solving problems. Students must have a focus on what the end result is supposed to look like before they start the

work. In solving the problem, they need to be aware of the significance of each part of the problem. Every step should be reflected upon, when executed. No stone should be unturned and no step should be skipped, without a good reason. The teacher can assist the student here by asking for a guess at the answer before the student starts. The student might be asked to paraphrase the problem to gain perspective. The nuts and bolts of the problem (the steps) have to be carefully checked by the student during the problem solving process and upon completion, by the teacher. All activities can relate to this sub-competency.

5. Analyze information and ideas to make decisions.

Information that is significant in finding an acceptable resolution to a problem must be distinguished from that which is unusable, trivial, and extraneous. The meaning and significance of key information must be developed and reinforced constantly. Development of this skill can come from dissecting stories and sentences as is done in grammar classes for parts of speech.

6. Synthesize information and ideas to progress to a higher
level of understanding.

The achievement of this competency comes when a student can work comfortably at the abstract level. The student is able to streamline the processes used at prior levels, integrate the big picture with the details, and apply resources to achieve a desired goal. Through routine stressing of activities that promote thinking skills, the student will eventually get here. Hopefully, the student will get to this level before she completes the course.

7. Evaluate evidence and generalizations against appropriate criteria.

The student has to be shown the importance of process over product. The process of problem solving must become ingrained in the psyche of the student to the point where answers are almost trivial. For this to occur, the student has to be given problems and processes to isolate helpful facts that can be used to make an educated guess about the broader situation.

8. Recognize and use induction, deduction, analogy, and intuition.

The use of problems and situations that require very little written work and are easily solvable could be used to develop these skills. Students have learned the basics of these skills early in life. Fine tuning is usually all that is needed.

9. Understand the fundamental concepts of a discipline.

Real understanding of a concept in a diverse setting is not always shown by getting the correct answers. As teachers, many of us have found true understanding only when we have to explain a concept to others. This is what our students need to do. If we get the students to explain the processes involved in solving a particular problem or paraphrase the notes or text, then true understanding can be seen. The students need not explain concepts to the instructor or class as a large group; a small study circle will do just as well.

MODELS OF TEACHING

Some of the models of teaching that fit easily into the critical thinking competency are concept attainment, scientific inquiry, inquiry training, simluation, role playing, thinking inductively, advanced organizer, and synetics. Each of these models allow for high levels of student involvement in either divergent or convergent manners that spawn creativity in thought processes which is a major part of critical thinking. Eventhough not all models are listed or discussed here, they can be used to teaching and develop critical thinking skills in students. Depending on the time, place, and class composition, one model will be more appropriate for meeting a particular competency. The well trainined and informed instructor can handle such situations, and does so everyday.

According to Stephen Brookfield, "a teacher should be competent (in communication & managing views democratically), show courage (to withstand resistance by students and peers to change), take risks (experiment), be humble (resist the arrogance of seeming the omniscient guru), and demonstrate political clarity (break free from oppressive groups' distorting perspectives)14." There is no doubt that situations will arise during the class period that were completely unexpected. The competent teacher will be able to handle the situation with care, caution, humility, honesty, and thoughtfulness. The teacher must be ready to demonstrate his or her own critical thinking abilities on a moment's notice in order to effectively transmit to the students proper skills.

ACTIVITIES FOR CRITICAL THINKING

The following activities and ideas are matched with the sub- competencies and teaching models that they most closely demonstrate. The activities are written as suggestions and may be modified freely.

INQUIRY TRAINING / SCIENTIFIC INQUIRY (COMP. 1, 4, 5)

An instructor might have the students in a class watch the instructor work a few problems on the board that are done in a routine and similar manner. The difference from tradition comes next. The students would not be allowed to write or speak during the demonstration. Once all the problems are completed, the students may interact with the purpose of figuring out what was done, why it was done, are the demonstrated strategies reproducible, and what are the vital steps in the process. The students would be able to ask the instructor questions that only have "Yes" or "No" answers.

GROUP INVESTIGATION (COMP. 1)

A "what's wrong with this picture" approach might be effective. An instructor could work several problems incorrectly and have the student figure out what part of the process contained the error. The use of actual student work in a student's own handwriting would work even better. The students are to be told only that there exists a flaw in the work shown. In groups, the students are to locate the mistake, discuss and react to the mistake, figure out why the mistake was made, correct the mistake, and finish the problem, taking the path set out by the original problem solver. This will give the students an opportunity to try to get inside someone else's head and

experiment with different learning and thinking styles. The rules will also prevent students from trashing an idea altogether in favor of going back to a familiar method.

THINKING INDUCTIVELY (COMP. 1, 3, 5, 7)

The students can be given several stories that request an answer from the reader. The reader might be requested to solve a mystery, solve an abstract word problem, solve a concrete word problem, or react to a situation, familiar or unfamiliar, and find its accompanying solution. For each story, the students are to seek the main idea or concept, state given information that might lead to a resolution, discuss unstated information that could lead to a resolution, identify critical information that is missing, devise any possible steps to finding the resolution, and hypothesize possible resolutions. This is all done without writing anything down. This will get the student reading first, thinking second, writing third, and solving fourth. Too often, students will start writing or solving before they know what they are writing about or trying to solving.

CONCEPT ATTAINMENT and THINKING INDUCTIVELY (COMP. 2, 3, 5, 6, 7)

A simple example, where relationships can be formed, involves the use of tables or graphs. The data collected within the tables or graphs can represent direct or indirect variations. The information might even be scattered enough to be void of interpretation. The students should be asked to state the apparent trends of the data, potential reasons for the trends, and what situation(s) the data could apply to. An example might illustrate a student's G.P.A. over several semesters. The class could then make predictions for future semesters, discuss why certain semesters may be better than others, hypothesize factors that affect grade point averages, set a

plan for graduation, and rate the quality of the student's college experiences. This particular example would be suited for a class session where student skills are addressed.

THINKING INDUCTIVELY (COMP. 2, 3, 4, 5, 6, 7)

Insufficient information could be given to the students about a situation or topic. The next step would be to ask them to decide on a relationship or correlation, without seeing the data. The data would then be brought out by the instructor for comparison. Topics that have acknowledged correlations and supporting data such as: smoking cigarettes and risk of lung cancer or studying and test scores or age and number of speeding tickets will gain student interest, be appropriate, and help the students form relationships and verify reliability of relationships.

SIMULATIONS (COMP. 3)

Problems that can be physically demonstrated, such as the tossing of ball or rolling marbles across a floor, can be investigated. In the investigations, the students should devise parameters for the situation's variables. Two obvious variables are distance and time. Rates can be calculated. Angles, room temperature, air pressure, and other variables that may affect the outcome should be discussed. The importance of these last variables can be determined and evaluated. The applications of negative numbers, unit conversions, and measurement techniques can be discussed.

SYNETICS (COMP. 3, 5, 8)

Relating current situations to those that students has no doubt encountered in the past is one way to get the student using inductive, deductive, intuitive, and analogous reasoning. $2x + 7x$ is

nothing more than 2 apples plus 7 apples or 2 twenty-ninths plus 7 twenty-ninths. If a student can set up analogous problems to the one at hand that are manageable, then success in imminent. This activity would center around the creation of real-life problems or situations that can be handled using abstract tools such as algebra. The students would have control over the development of examples.

OPEN MODEL (COMP. 2, 3, 5, 8)

The reason for this being called an "open model" is that the activity could transcend any other model. Intuitive reasoning refers to instinctive and reflexive behavior when problem solving. One way to have students develop and fine tune this would be to use timed instruments that allow for no more than a "gut reaction" to the situation. Have the students read a situation aloud and immediately start discussing solutions and approaches, without any reflection. The instructor might want to do the reading and ask for impromptu feedback. A "hot potato" approach could be taken. Here the students would only do or say one thing, pass the "potato" to another student, at random, for the next piece, and the process continues until a solution is found.

CONCLUSION

In conclusion, the development of critical thinking skills is tough for many, but possible for all. Students deserve to get more actively involved in projects and classroom activities that promote the strengthening of their abilities as critical problem solvers. Educators must be intentional and direct in approaches to foster critical thinking. No student should be able to matriculate without encountering critical thinking and intellectual growth in an environment that supports future experiences.